

REMARKS

Claims 12-29 are pending in the application. Claims 12-26 were objected to. Claims 16 and 20-21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 12, 14, and 19 were rejected under 35 U.S.C. § 102(b) as being anticipated by "Incorporation of a Cavity-dumped Oscillator In a Long Wavelength Injected Femtosecond Terawatt Ti:sapphire Laser" ("Cha"). Claims 12, 15-17, and 20-21 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application No. 2003/0099452 to Borrelli et al. ("Borrelli"). Claims 12-13, 18, 22-23, and 25-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,333,485 to Haight et al. ("Haight ") in view of Cha. Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Haight in view of U.S. Patent Application No. 2004/0111083 to Gross et al. ("Gross").

Claims 12, 14, 16, 17, 19-22, 24 and 25 have now been amended. Claims 1-11 were previously canceled. The preliminary amendment filed on December 17, 2004 added two claims labeled "25." Applicants thank the Examiner for pointing out the errors in the previous second claim 25. The second claim "25" has been canceled. Claims 26-29 have been added. New claim 26 corresponds to the second of previous claim 25. No new matter has been added.

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Objections to the Specification

The Specification was objected to for failing to provide proper antecedent basis for the claimed subject matter. Specifically, the Examiner contends that the terms "geometrically predeterminable form" and "chronologically predeterminable course" are not mentioned in the specification.

In response, Applicants respectfully direct the Examiner's attention to paragraph [0037] of the Specification, which states in part:

In the case of a further preferred version of the device according to the invention, a working beam of the beam source can be applied by the beam apparatus, in particular the deflection apparatus, in **geometrically predeterminable form in a temporally predeterminable pattern** to the material. (emphasis added).

Thus, the Specification clearly states that the beam source may be applied in a “geometrically predeterminable form.” Further, claim 22 is amended herein to recite “temporally predeterminable pattern” to be consistent with the Specification. Support for this amendment may be found in the Specification, for example, at paragraph [0037].

In view of the foregoing, reconsideration and withdrawal of the objections to the Specification is respectfully requested.

Objections to the Claims

Claim 13 was objected to under 37 C.F.R. § 1.75(c), as being of improper dependent form for failing to further limit the subject matter of claim 12. Claim 26 was objected to because claim 26 depends from canceled claim 11. Claim 25 was objected to because the word surgery is misspelled in this claim. Claims 12-26 were objected to because of the use of “fs” to abbreviate femtosecond.

Applicants have made appropriate amendments to the claims including adding new claim 26 to correspond to previous second claim 25 to address the informalities noted by the Examiner. Accordingly, reconsideration and withdrawal of the objections to claims 12-26 is respectfully requested.

Rejections under 35 U.S.C. § 112

Claims 16 and 20-21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

According to the Examiner, the claim language of claims 16 and 20-21 is incoherent. The Examiner also asserts that there is insufficient antecedent basis for "the beam apparatus," as recited in claim 20.

Applicants have amended claim 16 and 20 to more distinctly claim the subject matter recited therein. Additionally, Applicants have amended claim 20 to depend from claim 14, which provides sufficient antecedent basis for the term "the beam apparatus." Accordingly, reconsideration and withdrawal of the rejections of claims 16 and 20-21 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Rejections under 35 U.S.C. § 102

Claims 12, 14, and 19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Cha. Claims 12, 15-17, and 20-21 were rejected under 35 U.S.C. § 102 (e) as being anticipated by Borrelli.

Cha describes a cavity-dumped Ti:sapphire laser that is utilized as a front-end oscillator in a femtosecond terawatt Ti:sapphire laser. See Cha, Abstract. The output of the front-end cavity-dumped Ti:sapphire oscillator is applied to a seven-pass preamplifier to provide a high output power laser. See Cha, page 416, left column.

Borelli describes a system and method of using pulsed laser beams to irradiate spots within glass substrates at intensities sufficient to induce localized refractive index changes in the glass substrates. See Borelli, paragraph [0010]. Cavity-dump lasers may be used as appropriate for matching laser performance characteristics to material properties of the glass substrate. See Borelli, paragraph [0031].

Independent claim 12 has now been amended so as to recite:

- a pulsed laser system having a beam source including an unamplified cavity-dumped femtosecond oscillator; and
- a holding device configured to fix the material in a defined position relative to the beam source such that an unamplified output of the cavity-dumped femtosecond oscillator is directed to the material so as to destroy a cohesion of the material using photodisruption.

Support for the amendments to claim 12 may be found in the Specification, for example at paragraphs [0020], [0027], [0052], and Fig. 1.

It is respectfully submitted that Cha does not disclose a holding device configured to fix a material in a defined position relative to a beam source such that an unamplified output of a cavity-dumped femtosecond oscillator is directed to the material so as to destroy a cohesion of the material using photodisruption, as now recited in claim 12. In contrast, Cha describes a cavity-dumped oscillator that is amplified with a seven-pass preamplifier before being output by the laser. See Cha, page 416, left column. Moreover, Cha nowhere teaches or suggests that the unamplified output of the cavity-dumped oscillator is directed to a material so as to destroy the cohesion of the material using photodisruption. It is respectfully submitted that, because Cha fails to disclose at least the above-recited features of claim 12, it cannot anticipate claim 12, or its dependent claims 13-21 and 26-27. Reconsideration and withdrawal of the rejection of claims 12, 14, and 19 under 35 U.S.C. § 102(b) as being anticipated by Cha is respectfully requested.

It is respectfully submitted that Borelli also does not disclose a holding device configured to fix a material in a defined position relative to a beam source such that an unamplified output of a cavity-dumped femtosecond oscillator is directed to the material so as to destroy a cohesion of the material using photodisruption, as now recited in claim 12. In contrast, Borelli describes using a cavity-dumped laser to irradiate spots within glass substrates at intensities sufficient to induce localized refractive index changes in the glass substrates. See Borelli, paragraphs [0010] and [0031]-[0032]. Borelli does not teach or suggest that the cohesion of a material could be destroyed by an unamplified cavity-dumped femtosecond oscillator. It is respectfully submitted that, because Borelli fails to disclose at least the above-recited features of claim 12, it cannot anticipate claim 12, or its dependent claims 13-21 and 26-27. Reconsideration and withdrawal of the rejection of claims 12, 15-17, and 20-21 under 35 U.S.C. § 102(e) as being anticipated by Borelli is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 12-13, 18, 22-23, and 25-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Haight in view of Cha. Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Haight in view of Gross.

Haight describes a method for laser induced breakdown of a material using a pulsed laser beam. See Haight, Abstract. Haight describes that it is preferred that the laser medium be a sapphire that includes a titanium impurity responsible for the lasing action. See Haight, column 2, lines 48-51. The Examiner acknowledges that Haight does not disclose that the oscillator is cavity-dumped. See Detailed Action, page 6, lines 8-9.

Gross describes a system and method for applying pulsed energy to an eye, wherein the firing rate of the pulsed energy varies in correlation with a modeled or estimated thermal response of the tissue of the eye to the pulses of the laser beam during the treatment. See Gross, paragraph [0007]. The laser system may include excimer lasers such as argon-fluoride excimer lasers, and solid state lasers, including frequency multiplied solid state lasers such as flash-lamp and diode pumped solid state lasers. See Gross, paragraph [0039].

As noted above, independent claim 12 of the present application has now been amended so as to recite a holding device configured to fix a material in a defined position relative to a beam source such that an unamplified output of a cavity-dumped femtosecond oscillator is directed to the material so as to destroy a cohesion of the material using photodisruption. It is respectfully submitted that these features would not have been obvious in view of any combination of Haight, Cha, Gross, and Borelli. None of Haight, Cha, Gross, or Borelli teach or suggest using an unamplified output of a cavity-dumped femtosecond oscillator to destroy the cohesion of a material using photodisruption, as recited in claim 12. Haight merely describes a method for laser induced breakdown of a material using a conventional laser. See Haight, column 2, lines 48-51; column 11, lines 7-15. Cha merely describes that the output of a cavity-dumped front-end oscillator is applied to a seven-pass preamplifier to provide a high output power Ti:Sapphire laser. See Cha, page 416, left column. Cha nowhere teaches or suggests that the cavity-dumped front-end oscillator could be used without amplification. Regarding Gross, that reference merely describes methods for applying

pulsed energy to an eye, wherein the firing rate of the pulsed energy is varied in correlation with a modeled or estimated thermal response of the tissue of the eye to the pulses of the laser beam during the treatment. See Gross, paragraph [0007]. Gross does not describe the use of a cavity-dumped femtosecond oscillator at all. Moreover, as discussed above, Borelli merely describes using a laser to irradiate spots within glass substrates at intensities sufficient to induce localized refractive index changes in the glass substrates. See Borelli, paragraph [0010]. Thus, the combination of Haight, Cha, Gross, and Borelli does not teach or suggest that the unamplified output of a cavity-dumped femtosecond oscillator could be used in a device for machining material to destroy the cohesion of the material using photodisruption, as recited by claim 12. Thus, any combination of Haight, Cha, Gross, and Borelli, to the extent proper, could not render claim 12, or any of its dependent claims 13-21 and 26-27, obvious.

With respect to independent claim 22 of the present application, this claim has now been amended so as to recite:

providing a laser beam having femtosecond pulses using a beam source including an unamplified cavity-dumped femtosecond oscillator;
directing the laser beam without amplification on the material so as to destroy a cohesion of the material in a focus of the laser beam using photodisruption.

Support for the amendments to claim 22 may be found in the Specification, for example at paragraph [0020] and Fig. 1.

As discussed above with respect to claim 12, the combination of Haight, Cha, Gross, and Borelli does not teach or suggest using an unamplified cavity-dumped femtosecond oscillator to provide a laser beam that is directed on a material without amplification so as to destroy a cohesion of the material using photodisruption. Therefore, independent claim 22, and its dependent claims 23-25 and 28-29 are not obvious in view of the combination of Haight, Cha, Gross, and Borelli for the same reasons discussed above with respect to claim 12.

Reconsideration and withdrawal of the rejections of claims 12-13, 18, 22-23, and 25-26 under 35 U.S.C. § 103(a) in view of Haight and Cha, and of claim 24 under 35 U.S.C. § 103(a) in view of Haight and Gross is respectfully requested.

New Claims

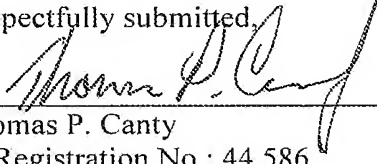
New claims 26-29 have been added. Claim 26 corresponds to previous second claim 25 with the dependency having been corrected to depend from claim 12. New claim 28 recites that the material that is machined includes an eye of a human patient. New claims 27 and 29 recite that the material that is machined includes a cornea of a human patient. Support for these new claims may be found in the Specification, for example, at paragraph [0054]. New claims 26 and 27 depend from claim 12 and are patentable for at least the same reasons as claim 12 is. Similarly, new claims 28 and 29 depend from claim 22 and are patentable for at least the same reasons as claim 22 is.

CONCLUSION

It is respectfully submitted that the application is now in condition for allowance.

The Commissioner is hereby authorized to charge any unpaid fees deemed required in connection with this submission, including any additional filing or application processing fees required under 37 C.F.R. §1.16 or 1.17, or to credit any overpayment, to Deposit Account No. 04-0100.

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